INSULATION AND INSTALLATION OF DUCTS

OREGON RESIDENTIAL SPECIALTY CODE (ORSC)

On April 1, 2021, the 2021 Oregon Residential Specialty Code (ORSC) became effective, introducing new requirements for the insulation and installation of ducts and revisions of existing provisions. Compliance with these new or revised sections has a customer-choice phase-in period through Sept. 30, 2021. After that date, these provisions become the mandatory prescriptive path for ORSC governed designs. This document highlights the intent of the new 2021 ORSC ductwork provisions for installing heating, ventilating and air-conditioning systems and provides compliance examples.

SECTION N1105.2— INSULATION OF DUCTS

All new duct systems, or new portions of duct systems exposed to unconditioned spaces, and buried ductwork within insulation that meets the exception to Section N1105.3, shall be insulated to a minimum level of R-8. Duct systems, or new portions of duct systems, located entirely within the building thermal envelope may be insulated to a level less than R-8.

SECTION N1105.3— INSTALLATION OF DUCTS

All new duct systems, air handling equipment and appliances shall be located fully within the building thermal envelope. Section M1601.4.11, *Ductwork installation location*, repeats this requirement.

It may not always be practical, or technologically or economically feasible to construct all duct systems fully within the building thermal envelope.

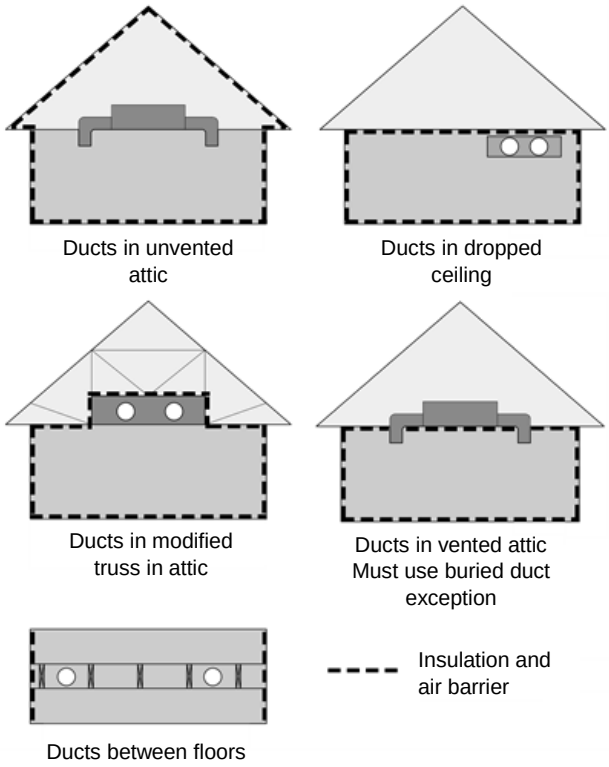

Figure 1

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As such, exceptions to this new requirement are as follows:

- Ventilation intake and exhaust ductwork.
- Up to 5% of the length of an HVAC system ductwork shall be permitted to be located *outside of the thermal envelope*. See Figure 6.
- Ducts *deeply buried* in insulation in accordance with all the following:
  - Insulation shall be installed to fill gaps and voids between the duct and the ceiling, and a minimum of R-19 insulation shall be installed above the duct between the duct and unconditioned attic. See Figure 2.
  - Insulation depth marker flags shall be installed on the ducts every 10 feet or as approved by the building official. See Figure 3.

Fiberglass batt material may be used to achieve the R-19 insulation level above the duct. See Figure 4.

For buried ducts to be considered inside conditioned space, the air handler must be installed inside conditioned space. This practice typically requires constructing a mechanical closet below the ceiling plane. See Figure 5. For air handlers installed in attics, the unit should not be buried in insulation to ensure access for maintenance and proper function of the equipment.

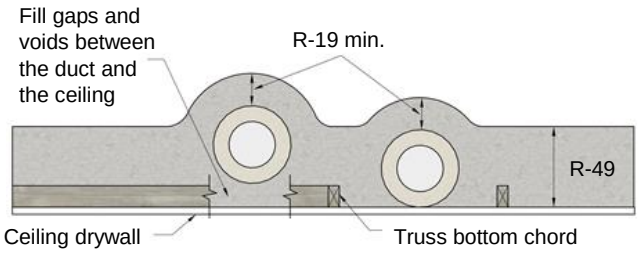

Figure 2

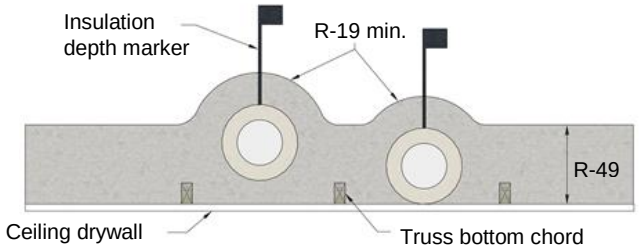

Figure 3

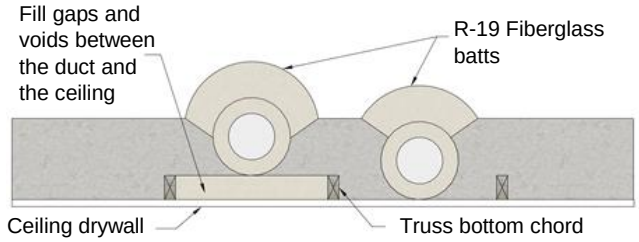

Figure 4

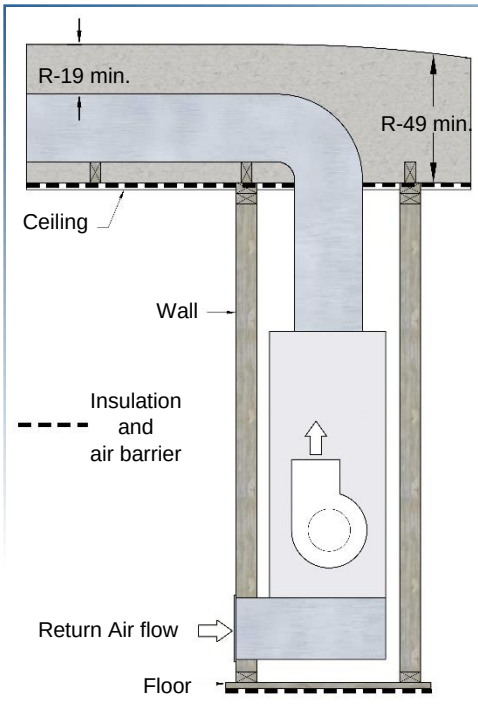

Figure 5

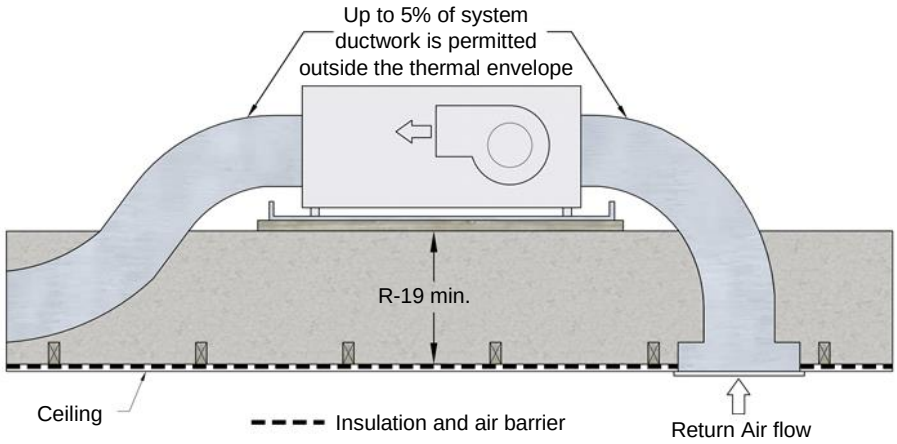

Figure 6

SECTION M1601.1.1.1—
USE OF BUILDING CAVITIES IN NEW CONSTRUCTION

Except as allowed by Section M1601.1.1, the use of building cavities for air ducts or plenums is *not* allowed in new construction or in an addition to an existing structure. For stud wall cavities and spaces between solid floor joists to be used as transfer air plenums, they must comply with five specified conditions.

SECTION M1601.1.1.2—
USE OF BUILDING CAVITIES IN EXISTING BUILDINGS

The use of building cavities for air ducts or plenums is allowed in the alteration or remodel of an existing structure. For stud wall cavities and spaces between solid floor joists to be used as air ducts or plenums, they must comply with five specified conditions.

SECTION M1601.4.1—
JOINTS, SEAMS AND CONNECTIONS

Tape shall *not* be used to seal metal ductwork, or be used as the sealing method between metal duct and flexible or fibrous duct. Tape is *only* allowed to be used with metal duct at connections to equipment requiring future replacement. Joints, longitudinal and transverse seams, and connections of ductwork shall be securely fastened and may only be sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems, liquid sealants, or approved equivalents.

CONCLUSION

To achieve the U.S. Department of Energy (DOE) Zero Energy Ready Homes (ZERH) performance equivalency for regulated site energy use by 2023, the division took this step to improve heating and cooling performance by incorporating portions of the ZERH insulation and installation requirements into the 2021 ORSC.

There are many ways to achieve locating the duct systems and air handling equipment fully within the building thermal envelope. If this is not feasible, then the duct systems deeply buried in insulation is an acceptable alternative. The use of building cavities and tape is no longer allowed, except as outlined above.

As with all site-specific matters, it is recommended to begin development discussions early in the initial planning stages. This technical recommendation also reminds the end user that local building officials retain broad local flexibility and discretionary authority on administration and enforcement of the state building code.